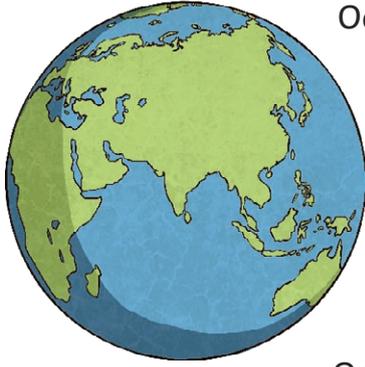


Layers of the Ocean



Oceans cover two thirds of our Earth. There are five oceans which all flow into each other.

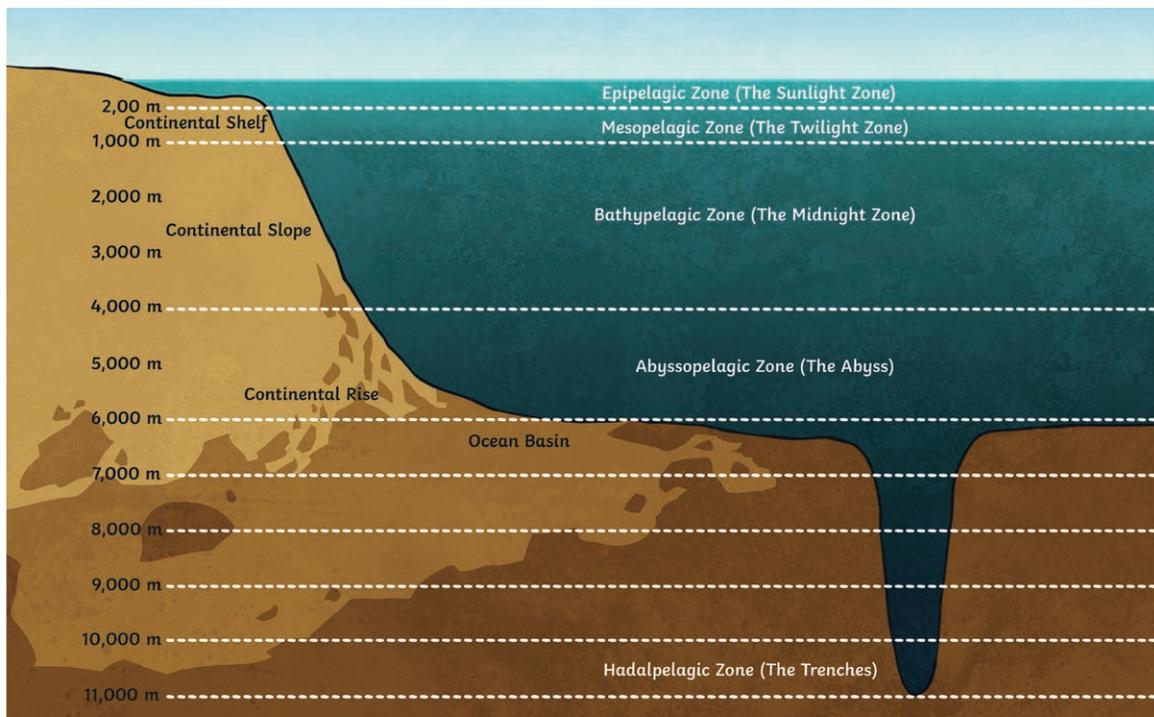
Oceans should not be confused with seas.

Seas are smaller than oceans and are usually located where the land and ocean meet. Look at this map of the United Kingdom as an example:



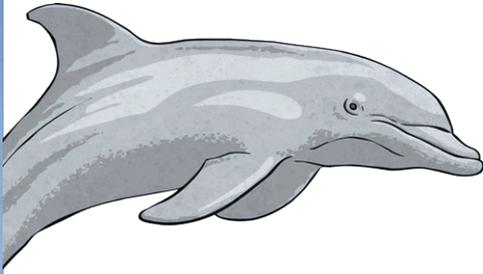
What Are the Layers of the Ocean?

Oceans are made of five layers which all have different temperatures, amount of light and creatures living within them.



Sunlight Zone – up to 200m below the surface of the ocean

There is plenty of sunlight and heat in this zone although they both get less the deeper you go. Due to the light and warmth, this is the layer with the most life, including:



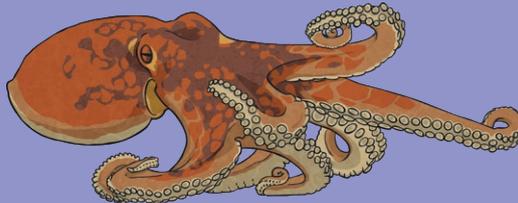
- seaweed which plant feeders eat;
- fast swimming hunters, such as dolphins (mammals which breathe air) and salmon;
- coral reefs.

Humans enjoy this layer for activities such as swimming, fishing and sea transport.

Twilight Zone – up to 1000m below the surface of the ocean

This layer has only faint sun rays reaching it due to its depth. It is home to some of the strangest sea animals, which often have large eyes to help them see, including:

- the sea cucumber;
- the swordfish;
- the wolf eel;
- the octopus.



No plants grow within this layer so creatures either feed by filtering the water or by hunting other creatures at speed. Humans can dive to this layer but must wear protective suits due to the extreme pressure and the lack of warmth.

Midnight Zone – up to 4000m below the surface of the ocean

The Midnight Zone makes up 90% of the ocean. It gets its name from the fact that sunlight cannot reach this layer but some light can be seen from the creatures that produce their own light, such as:

- the anglerfish;
- the viperfish;
- the jellyfish.

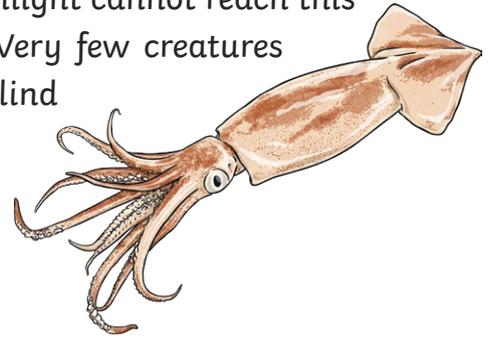


There are large numbers of creatures living within this layer and many of them are red or black due to the low light levels. Some creatures, such as the sperm whale, dive to these depths to hunt for food.

Abyss – up to 6000m below the surface of the ocean

This layer contains three quarters of the ocean bed, which is covered with thick mud made from the remains of dead animals. The sunlight cannot reach this layer at all, so it is pitch-black and near freezing. Very few creatures live here but those that do are mainly transparent, blind invertebrates, such as:

- sea stars;
- amphipods (shrimps);
- squid.



The Trench – up to 11,000m below the surface of the ocean

The Trench is also known as the ocean floor. It is a series of narrow, underwater valleys which can only be explored using specialist scientific equipment. This is due to the high pressure and the near freezing temperatures. There is no natural light in this zone but different creatures can be found, such as sea stars.

Did you know...?

The deepest part of the ocean ever to be explored by man is in the Mariana Trench. It is almost 11,000m deep!

The ocean is an incredible part of our world and sea scientists hope that it will be explored more as technology advances.

Questions

1. How deep is the Twilight Zone? Tick **one**.

- up to 200m below the surface of the ocean
- up to 1000m below the surface of the ocean
- up to 4000m below the surface of the ocean
- up to 6000m below the surface of the ocean

2. Which creatures are found in the Abyss? Tick **three**.

- sea stars
- amphipods
- jellyfish
- squid

3. How much of the ocean bed is contained within the Abyss?

4. How do creatures feed in the Twilight Zone?

5. **Find** and **copy** an adjective which tells you that the Abyss is dark.

6. Summarise what you have learned about the Trenches, in 30 words or less.

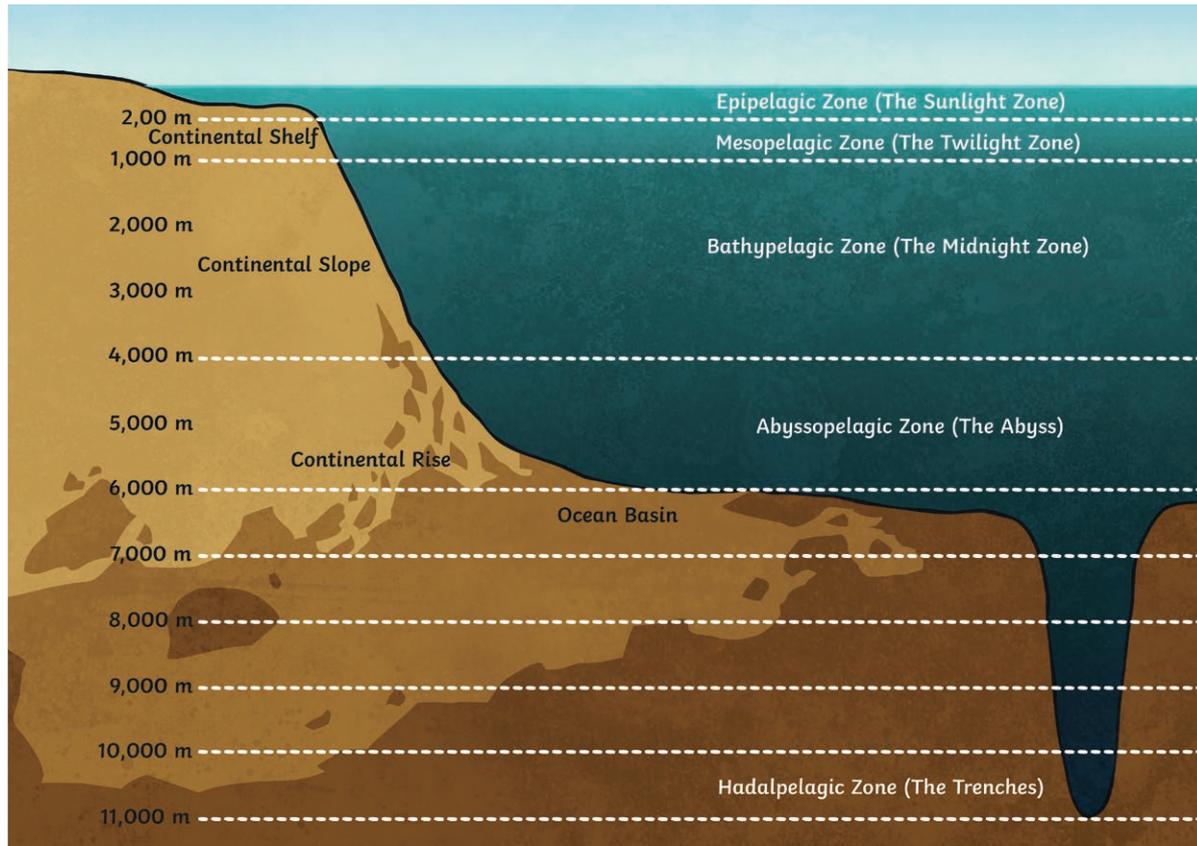
7. In your own words, explain why the Sunlight Zone was given that name.

8. Which layer of the ocean would you most like to visit? Give **two** reasons to explain your choice.

Answers

1. How deep is the Twilight Zone? Tick **one**.
 - up to 200m below the surface of the ocean
 - up to 1000m below the surface of the ocean**
 - up to 4000m below the surface of the ocean
 - up to 6000m below the surface of the ocean
2. Which creatures are found in the Abyss? Tick **three**.
 - sea stars**
 - amphipods**
 - jellyfish
 - squid**
3. How much of the ocean bed is contained within the Abyss?
Three quarters of the ocean bed is contained within the Abyss.
4. How do creatures feed in the Twilight Zone?
Filtering the water; hunting other creatures at speed.
5. **Find and copy** an adjective which tells you that the Abyss is dark.
Pitch-black
6. Summarise what you have learned about the Trenches, in 30 words or less.
Pupils' own responses, such as: Also called the ocean floor, the Trench is up to 11,000m below the surface. High pressure and extreme cold mean it can only be explored with scientific equipment. Some creatures are found here even though there is no natural light.
7. In your own words, explain why the Sunlight Zone was given that name.
Pupils' own responses, such as: The Sunlight Zone has that name because it is closest to the surface so is the layer that gets the most sunlight.
8. Which layer of the ocean would you most like to visit? Give **two** reasons to explain your choice.
Pupils' own responses, such as: I would like to visit the Midnight Zone because I'd like to see that creatures that produce their own light and I'd also love to see a huge sperm whale diving for food.

Layers of the Ocean



Oceans cover two thirds of our Earth, making up 362 million km² of the Earth's surface. There are five oceans (the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Antarctic or Southern Ocean and the Arctic Ocean) but they are not separated; they all flow into each other. The Pacific Ocean is the largest and deepest of all the oceans. It is so deep in places that the world's tallest mountain, Everest, would sink without a trace!

Oceans should not be confused with seas. Seas are smaller than oceans and are usually located where the land and ocean meet as seen on this map of the United Kingdom:



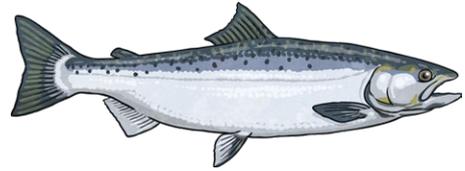
What Are the Layers of the Ocean?

Oceans are made of five distinct layers which all have their own characteristics, including temperature, light and the creatures living within them.

Epipelagic Zone (Sunlight Zone)

This layer is from the surface to around 200m below the surface of the ocean so sunlight is able to reach it. There is plenty of light and heat in this zone although they both decrease the deeper you go. Due to the light and warmth, this is the layer with the most life, including:

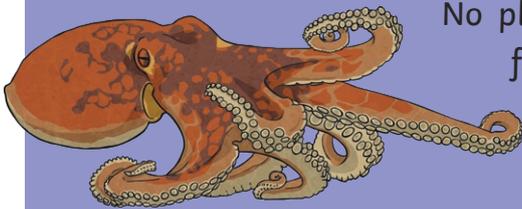
- seaweed which plant feeders eat;
- fast swimming hunters, such as dolphins (mammals which breathe air) and salmon;
- coral reefs.



Humans enjoy this layer for activities such as swimming, fishing and sea transport.

Mesopelagic Zone (Twilight Zone)

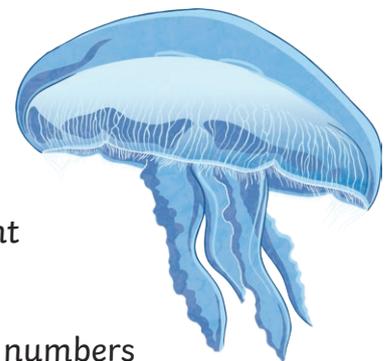
This layer reaches to 1000m below the surface of the ocean so only faint sun rays reach it. It is home to some of the strangest sea animals, which often have large eyes to help them see, including the sea cucumber, swordfish, wolf eel and octopus.



No plants grow within this layer so creatures either feed by filtering the water or hunting other creatures at speed. Humans can dive to this layer but have to wear protective suits due to the extreme pressure and lack of warmth.

Bathypelagic Zone (Midnight Zone)

The Midnight Zone, which makes up 90% of the ocean, is up to 4000m below the surface of the ocean. It gets its name from the fact that sunlight cannot reach this layer. Some plants and creatures such as, the anglerfish, the viperfish and the jellyfish produce their own light (bioluminescent). This light is used to hunt their prey.

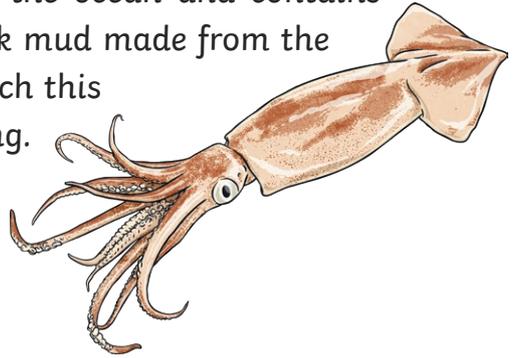


Although the pressure in this layer is high, there are large numbers of creatures living within it. Many of the animals are red or black due to the low light levels. Some creatures, such as the sperm whale, dive to these depths to hunt for food.

Abyssopelagic Zone (Abyss)

This layer is up to 6000m below the surface of the ocean and contains 75% of the ocean bed, which is covered with thick mud made from the remains of dead animals. The sunlight cannot reach this layer at all so it is pitch-black and near freezing.

Very few creatures live here but those that do are mainly transparent, blind invertebrates, such as sea stars, amphipods (shrimps) and squid.



Hadalpelagic Zone (The Trenches)

The Trench is up to 11,000m below the surface of the ocean and is also known as the ocean floor. It is actually a series of underwater canyons (or narrow valleys) which can only be explored using specialist scientific equipment. This is due to the high pressure and near freezing temperatures. There is no natural light in this zone but unique creatures can be found, including some sea stars.

Did you know...?

The deepest part of the ocean ever to be explored by man is in the Mariana Trench. It is almost 11,000m deep!

The ocean is an incredible part of our world and oceanographers (sea scientists) hope that it will be explored more thoroughly as technology advances to increase our knowledge and enable us to protect the oceans for future generations.

Questions

1. How deep is the Bathypelagic Zone? Tick **one**.

- up to 200m below the surface of the ocean
- up to 1000m below the surface of the ocean
- up to 4000m below the surface of the ocean
- up to 6000m below the surface of the ocean

2. Match the zone to the animals found within it.

Mesopelagic Zone	sea stars, amphipods (shrimps) and squid
Bathypelagic Zone	sea cucumber, swordfish, wolf eel and octopus
Abyssopelagic Zone	anglerfish, viperfish and jellyfish

3. **Find** and **copy** a word that means the same as narrow valleys.

4. Name **two** conditions that mean it is only possible to explore the Twilight Zone wearing protective clothing.

- _____
- _____

5. Describe **two** reasons why oceanographers wish to explore the oceans more.

6. Summarise what you have learned about the Abyss, in 40 words or less.

7. In your own words, explain why the Twilight Zone was given that name.

8. How do you think that bioluminescent creatures use light to hunt their prey?

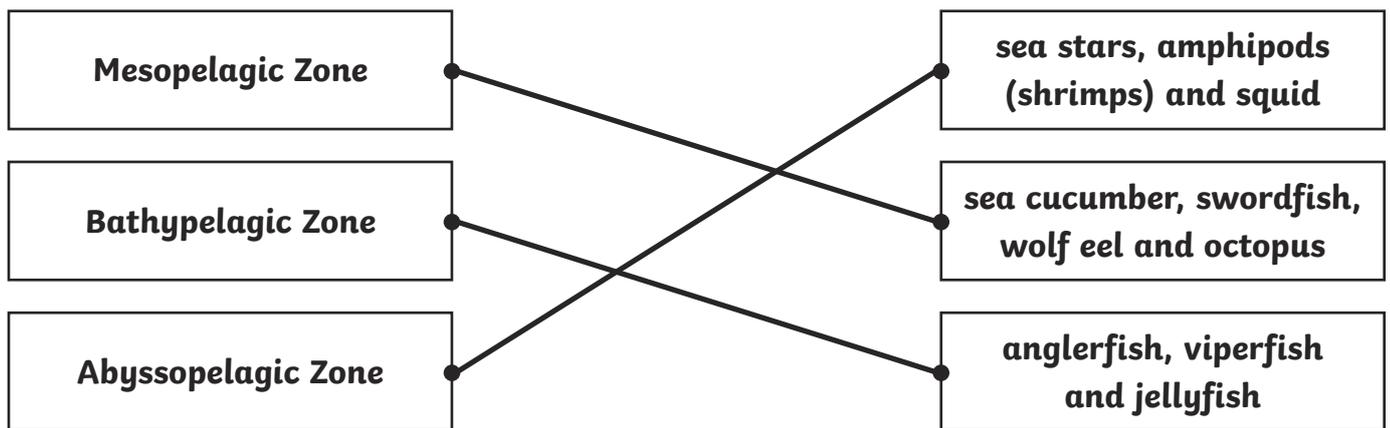
9. Which layer do you think is the most interesting? Give **two** reasons for your choice.

Answers

1. How deep is the Bathypelagic Zone? Tick **one**.

- up to 200m below the surface of the ocean
- up to 1000m below the surface of the ocean
- up to 4000m below the surface of the ocean**
- up to 6000m below the surface of the ocean

2. Match the zone to the animals found within it.



3. **Find and copy** a word that means the same as narrow valleys.
canyons

4. Name **two** conditions that mean it is only possible to explore the Twilight Zone wearing protective clothing.

Extreme pressure; lack of warmth.

5. Describe **two** reasons why oceanographers wish to explore the oceans more.

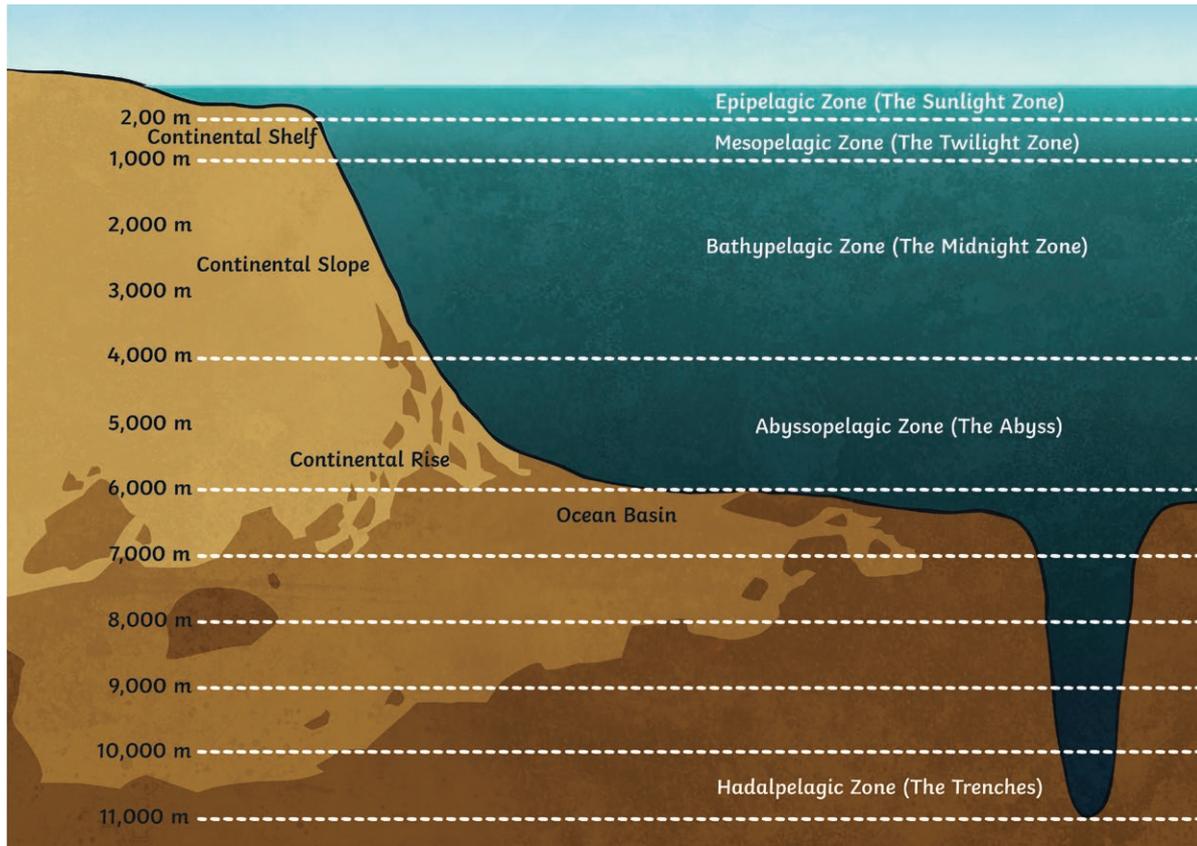
Oceanographers wish to explore the oceans more to increase our knowledge and enable us to protect the oceans for future generations.

6. Summarise what you have learned about the Abyss, in 40 words or less.

Pupils' own responses, such as: Up to 6000m below the surface and containing 75% of the ocean bed, no sunlight reaches this layer so it is totally dark and nearly freezing with very few creatures.

7. In your own words, explain why the Twilight Zone was given that name.
Pupils' own responses, such as: The Twilight Zone was given that name because it is nearly dark due to very little sunlight reaching it and twilight is the time of day when the sun has nearly set and it is getting close to being dark.
8. How do you think that bioluminescent creatures use light to hunt their prey?
Pupils' own responses, such as: I think that bioluminescent creatures use light as a lure to entice their prey towards them because they might think that the light is something good to eat (a plant).
9. Which layer do you think is the most interesting? Give **two** reasons for your choice.
Pupils' own responses, such as: I think that the Hadalpelagic Zone is the most interesting layer because it is the one which has been studied the least (meaning there is the most still to find out) but oceanographers have already discovered that some creatures are able to live in the difficult conditions within the Trenches.

Layers of the Ocean



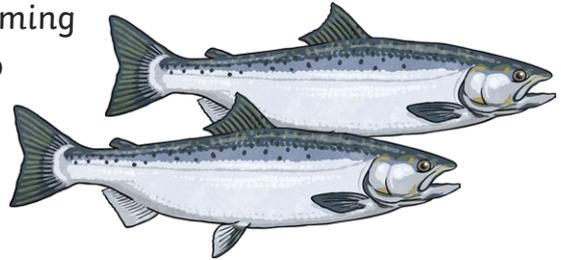
Making up 362 million km² of the Earth's surface, oceans cover two thirds of our Earth. There are five oceans (the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Antarctic or Southern Ocean and the Arctic Ocean) which are not separated and all flow into each other. The Pacific Ocean is the largest and deepest of all the oceans. It is so deep in places that the world's tallest mountain, Everest, would sink without a trace! Oceans should not be confused with seas, which are smaller than oceans and are usually located where the land and ocean meet, for example, around the coast of the UK, there is the North Sea, the English Channel and the Irish Sea.

Oceans are made of five distinct layers which all have their own characteristics, including temperature, light and the creatures living within them.



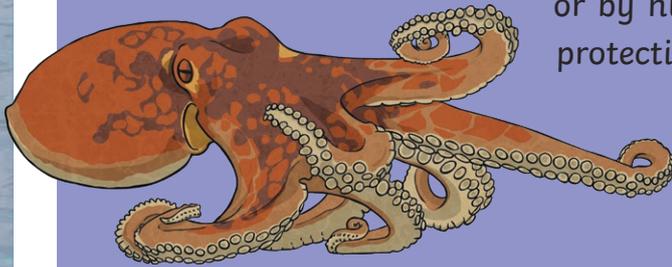
Epipelagic Zone

This layer, which is also known as the Sunlight Zone, extends from the surface to around 200m below the surface of the ocean. There is plenty of light and heat in this zone although they both decrease with depth. Due to the conditions within this zone, there is a wide variety of life found, including: coral reefs, seaweed (which plant feeders eat) and fast swimming hunters, such as dolphins and salmon. Due to its accessibility and favourable state, humans regularly utilise this layer for activities such as swimming, fishing and sea transport.



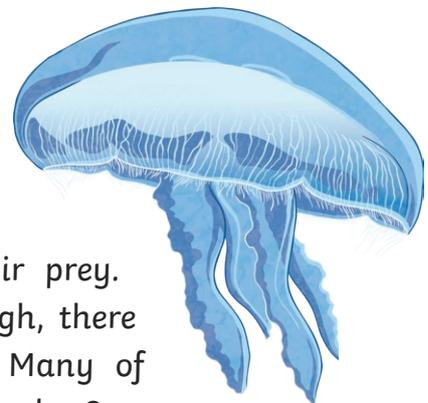
Mesopelagic Zone

This layer is also known as the Twilight Zone due to being up to 1000m below the surface of the ocean. With only faint sun rays reaching it, this layer is home to some of the strangest sea animals, including the sea cucumber, swordfish, wolf eel and octopus, which often have large eyes to help them see. Due to the absence of plants growing within this layer creatures either feed by filtering the water or by hunting other creatures at speed. Wearing protective suits due to the extreme pressure and lack of warmth, humans are able to dive to this layer. Some people do this for fun whereas others do so in order to research the oceans.



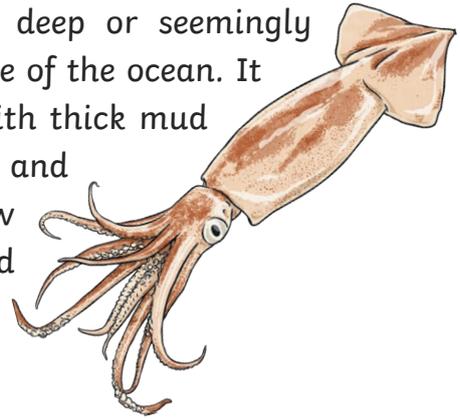
Bathypelagic Zone

The Midnight Zone, which makes up 90% of the ocean, is up to 4000m below the surface of the ocean. No sunlight can reach this layer although some light can be seen from the bioluminescent creatures that produce their own light (such as anglerfish, viperfish and jellyfish) which they use to hunt their prey. Surprisingly, although the pressure in this layer is high, there are a large numbers of creatures living within it. Many of the animals are red or black due to the low light levels. Some creatures, such as the sperm whale, dive to these depths to hunt for food.



Abyssopelagic Zone

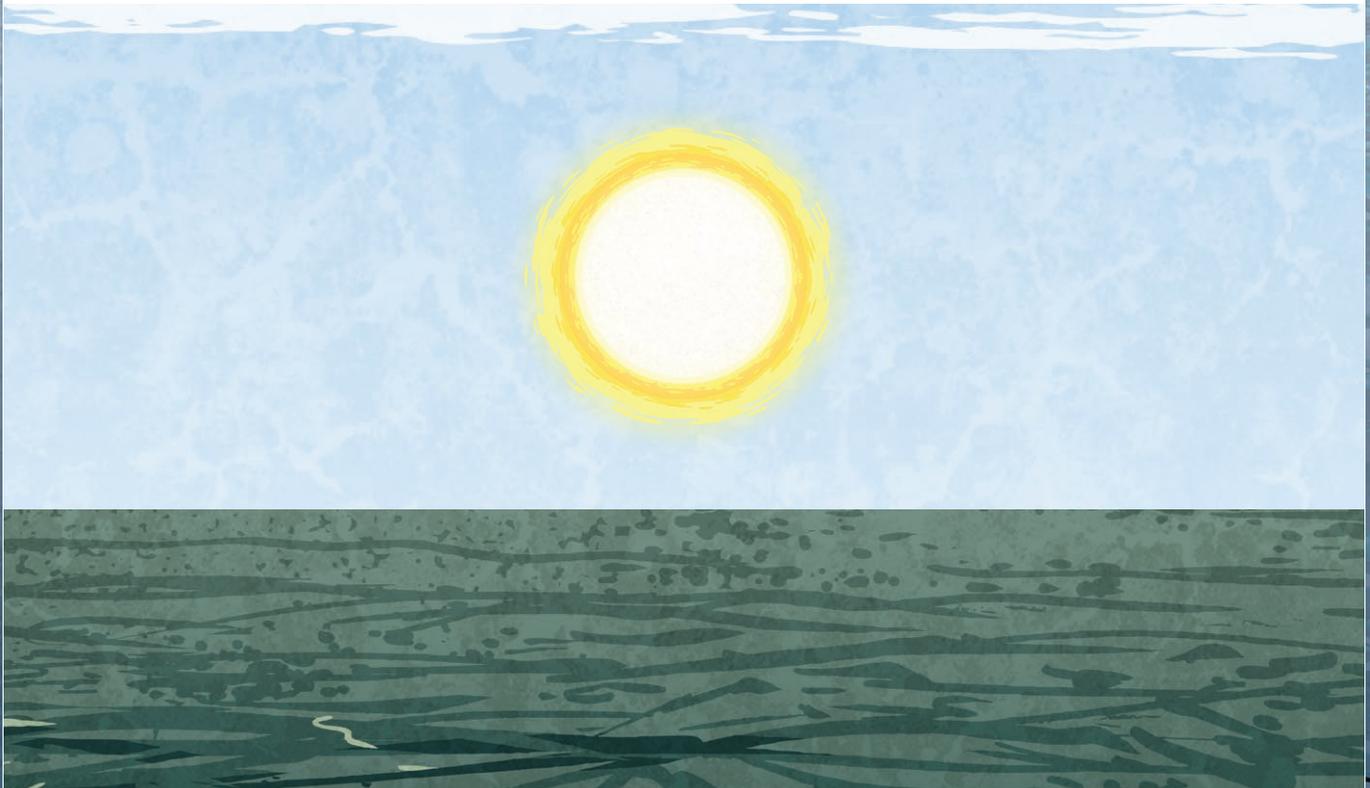
This layer, known as the Abyss (which means a deep or seemingly bottomless chasm), is up to 6000m below the surface of the ocean. It contains 75% of the ocean bed, which is covered with thick mud made from the remains of dead animals. Pitch-black and near freezing due to a total lack of sunlight, very few creatures live here apart from a group of (often) blind invertebrates, which are mainly transparent, such as sea stars, amphipods (shrimps) and squid.



Hadalpelagic Zone

Up to 11,000m below the surface of the ocean the Hadalpelagic Zone, which is also known as the Trench or the ocean floor, is actually a series of underwater canyons (or narrow valleys). This can be explored by humans only when using specialist scientific equipment due to the high pressure and near freezing temperatures. The deepest part of the ocean ever to be explored by man is in the Japanese Mariana Trench, which is almost 11,000m deep! Natural light is unable to penetrate to the trenches but unique creatures can be found, including certain sea stars.

The ocean is an incredible part of our world that oceanographers (sea scientists) hope will be more thoroughly explored as technology advances to increase our knowledge and enable us to protect the oceans for future generations.



Questions

1. Which of these are true facts about oceans? Tick **two**.

- Oceans cover two thirds of the Earth's surface.
- The five oceans are all separate.
- The Atlantic Ocean is the deepest ocean.
- Oceans are made of five distinct layers.

2. Which of these is another name for the Mesopelagic Zone? Tick **one**.

- Sunlight Zone
- Twilight Zone
- Midnight Zone
- Abyss

3. Due to the **absence** of plants growing within this layer...

What does **absence** mean?

4. What is the depth of the Abyss?

5. **Find** and **copy** a word from the text which shows that creatures found in the Trenches are one of a kind.

6. In your own words, explain why the Midnight Zone was given that name.

7. Summarise what you have read about the Epipelagic Zone in 40 words or less.

8. Why do you think that the creatures in the Abyss are usually blind?

9. Why do plants not grow in the Twilight Zone?

10. Why is it important to protect the oceans for future generations? Give evidence to support your answer.

Answers

- Which of these are true facts about oceans? Tick **two**.
 - Oceans cover two thirds of the Earth's surface.**
 - The five oceans are all separate.
 - The Atlantic Ocean is the deepest ocean.
 - Oceans are made of five distinct layers.**
- Which of these is another name for the Mesopelagic Zone? Tick **one**.
 - Sunlight Zone
 - Twilight Zone**
 - Midnight Zone
 - Abyss
- Due to the absence of plants growing within this layer...
What does absence mean?
Absence means non-existence or lack of.
- What is the depth of the Abyss?
The Abyss is up to 6000m below the surface of the ocean.
- Find** and **copy** a word from the text which shows that creatures found in the Trenches are one of a kind.
unique
- In your own words, explain why the Midnight Zone was given that name.
Pupils' own responses, such as: The Midnight Zone was given that name because it is (almost) totally dark as it would be at midnight due to a total lack of sunlight.
- Summarise what you have read about the Epipelagic Zone in 40 words or less.
Pupils' own responses, such as: From the surface to 200m below there is plenty of light and heat (which decrease with depth) so much life in this layer; humans also use this layer for leisure activities and travel.
- Why do you think that the creatures in the Abyss are usually blind?
Pupils' own responses, such as: There is no light at all in this layer so even if creatures had eyes, it would be impossible to see.

9. Why do plants not grow in the Twilight Zone?

Pupils' own responses, such as: Only faint rays of sunlight penetrate the Twilight Zone and as plants need sunlight to grow, they will be unable to do so within this layer.

10. Why is it important to protect the oceans for future generations? Give evidence to support your answer.

Pupils' own responses, such as: It is important to protect the oceans for future generations because they make up two thirds of our Earth and contain myriad plants and animals (some of which are yet to be discovered!). Humans also enjoy using the oceans for pleasure and to make travel easier.